

REMARKS

This Preliminary Amendment and Request for Reconsideration and Withdrawal of the Restriction Requirement per 37 C.F.R. § 1.143 is in response to a restriction requirement imposed by the Examiner in Paper No. 3 dated December 12, 2001. Upon entry of this Preliminary Amendment, claims 1-10 and 15-34 will be pending in this application. Claims 11-14 have been canceled without prejudice or disclaimer as to their subject matter, claims 17, 22 and 23 have been amended and claims 26-34 have been newly added by this Preliminary Amendment.

The Examiner has imposed a two-way restriction requirement to Applicants' claims 1-25. The Examiner states in Paper No. 3 that Group I is drawn to claims 1-22, classified in 347/48 while Group II is drawn to claims 23-25 and is classified in 216/27. Applicants elect Group I with traverse.

Class 347 pertains to incremental printing of symbolic information. Subclass 48 pertains to plural transducers, and is an indent of ejector mechanisms (printhead) and inkjet. Class 216 pertains to etching a substrate: Processes, and subclass 27 pertains to forming or testing thermal ink jet article (e.g., printhead...). The Examiner justifies the restriction under MPEP § 806.05 (f) by alleging that "In the instant case the product as claimed can be made by another materially different process, such as laser ablation." Applicants respectfully disagree.

Applicants submit that claim 23, as amended, pertains to a process for mass production of a large number of ink-jet printheads. The Examiner submits claims 23-25 can be performed by laser

ablation. Applicants' respectfully disagree. Applicants have found no evidence that laser ablation is either a viable or preferred method for making inkjet printheads in a manufacturing environment. This is because the current state of the art indicates that laser ablation "microetches" a single, narrow line at a time as is disclosed in U.S. Patent No. 6,034,348. It would be impractical, and most likely impossible, to use laser ablation to form complicated structures as illustrated in Applicants' FIGS. 12, 17 and 21. Furthermore, Applicants' submit that in a manufacturing environment, a plurality of structures, like the ones illustrated in Applicants' FIGS. 12, 17 and 21 are formed simultaneously on a wafer. Each ink jet printhead consumes 1 die on a wafer in production, and there are numerous dies on a wafer in manufacturing. The photoresist masks used have this plurality of dies to cover the whole wafer with one exposure. Meanwhile, in laser ablation, only light emitted from a tip of an optical fiber can achieve any etching (see U.S. Patent No. 6,034,348). Therefore, Applicants' submit that laser ablation would not be a feasible or useful method to mass manufacture the structures illustrated in FIGS. 12, 17 and 21. Applicants have seen no evidence of laser ablation working in a mass production manufacturing facility. Applicants challenge the Examiner to 1) demonstrate that laser ablation can be used in a mass manufacturing facility where a large number of chips or printheads are produced per day and 2) demonstrate that laser ablation has a place in a mass production manufacturing facility to produce all the features illustrated in Applicants' FIGS. 12, 17 and 21 that are achieved by "etching".

Even if the Examiner can demonstrate (1) and (2) above, Applicants' submit that claims 23-25, as claimed, do not preclude the use of "laser ablation" by claiming "etching". That being the

case, Applicants submit that the structure as claimed in Applicants' claims 1-10 and 15-22 can only be made by the process as claimed in Applicants' claims 23-25 as Applicants submit that "etching" can be construed to include "laser ablation". It is therefore respectfully requested that the Examiner withdraw the restriction requirement presented in Paper No. 3.


Applicants also note that the last conference on laser ablation (COLA) was held in 1997. Applicants' submit that if laser ablation were a useful and widespread alternative to etching, more conferences since 1997 would be well known. Therefore, Applicants submit that laser ablation is an obscure, impractical substitute for etching that has no place in a high-volume, profitable manufacturing environment. As a result, Applicants submit that the Examiner has failed to produce a fair and reasonable "materially different process" for manufacturing Applicants' claimed ink jet printhead. As a result, Applicants request reconsideration and withdrawal of the restriction requirement imposed by the Examiner in Paper No. 3.

Applicants have newly added claims 26-34 by this Preliminary Amendment. Claims 26-28 are depending apparatus claims depending from claim 1 that claims the process claimed in claims 23-25. Claims 29-31 are depending apparatus claims depending from claim 17 that claims the process claimed in claims 23-25. Claims 32-34 are depending apparatus claims depending from claim 19 that claims the process claimed in claims 23-25. Thus, claims 26-34 are linking claims that must be examined with the elected Group I, and if allowed, the restriction requirement imposed in Paper No. 3 must be withdrawn (see MPEP § 806.05 (e)).

A fee of \$90.00 is incurred upon filing this Preliminary Amendment for the addition of five (5) claims in excess of 20. Applicant's check drawn to the order of Commissioner accompanies this Response. Should the check become lost, be deficient in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

In view of the foregoing amendments, all claims are believed to be in condition for completion of the examination. Should questions arise however, the Examiner is requested to telephone applicant's undersigned attorney.

Respectfully submitted,


Robert E. Bushnell,
Attorney for the Applicant
Registration No.: 27, 774

1522 "K" Street N.W., Suite 300
Washington, D.C. 20005
(202) 408-9040

Folio: P56310
Date: 1/14/02
I.D.: REB/ML

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS



Please cancel claims 11-14 without prejudice or disclaimer as to their subject matter, amend claims 17, 22 and 23 as follows and newly add claims 26-34 as set forth above:

1 17. (Amended) The ink-jet printhead of claim 15, wherein each one of said plurality of
2 heaters is adjacent to [one] corresponding ones of said plurality of holes perforating said substrate,
3 [each one of said plurality of holes perforating said substrate and] each one of said plurality of
4 heaters being disposed on said front side of said substrate, each corresponding ones of said plurality
5 of heaters and each one of said plurality of holes perforating said front side of said substrate being
6 aligned to a corresponding [at a bottom of] one of said plurality of holes perforating said nozzle
7 plate.

1 22. (Amended) The ink-jet printhead of claim 21, [wherein each one of said plurality of
2 nozzle holes perforating said nozzle plate is essentially conical in shape] a portion of each one of
3 said plurality of nozzle holes near said bottom side of said nozzle plate being cylindrical while
4 portions of each one of said plurality of nozzle holes near said top side of said nozzle plate being
5 conical in shape.

1 23. (Amended) A method for mass production of a large number of printheads [producing

an ink-jet printhead], comprising the steps of:

etching a channel into a bottom side of a silicon substrate;

etching a plurality of holes on a bottom of said channel of said substrate to perforate said substrate;

depositing a first plurality of signal lines and a second plurality of signal lines on a front side of said silicon substrate, each one of said first plurality of signal lines terminating near termination points of corresponding ones of said second plurality of signal lines, each of said terminating portions of said first and said second signal lines terminating near at least one of said plurality of holes perforating said substrate;

depositing a resistive material so as to connect terminating ends of each one of said first plurality of signal lines with corresponding ones of said [plurality of] second plurality of signal lines, said resistive material being near at least one of said plurality of holes perforating said substrate; and

attaching a nozzle plate perforated by a plurality of nozzle holes onto said front side of said substrate so that each one of said plurality of nozzle holes is aligned to corresponding ones of terminating ends of said first and said second signal lines, said resistive material, and at least one of said plurality of holes perforating said substrate.